A noncausal counterpart of Girsanov's theorem

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Abstract; An SPDE of the first order, including the white noise as coefficients at least in its principal part as follows, is called **BPE**(*Brownian particle equation*);

$$\partial_t u + \{a(t,x) + b(t,x)\dot{W}\}\partial_x u = \{A(t,x) + B(t,x)\dot{W}\}u + C(t,x),$$

where $\dot{W} = \frac{d}{dt}W_t$, the derivative of Brownian motion W_t, is the white noise.
The SPDE of this type was first introduced by S.Ogawa in 1969 ([1], [2]) as a stochastic model for the transport phenomena carried by a mass of brownian particles. It is to be remarked that this SPDE appears as an intermediate between two PDEs of differnet types, parabolic and hyperbolic PDEs, and we may be suggested that we can construct the solution of parabolic PDE via the solution of hyperbolic PDE. For instance the Feynmann-Kac formula may be understood in such order of consideration.
We are concerned with fundamental properties of BPE together with their applications. In this talk first we are to show some recent results about fundamental properties of the BPE ([3],[5]) and then as an application we are to show a noncausal counter-part of Girsanov's theorem ([5],[6]). The discussions are developed in the framework of the noncausal calculus introduced by the lecturer in 1979 ([3],[4]).

References

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